

REMARKS

Claims 24-35 are pending in this application. Claims 24-34 stand rejected and claims 1-23 were previously canceled without prejudice. By this Amendment, claims 24 and 34 have been amended and new claim 35 has been added. No new matter has been added. The amendments made to the claims do not alter the scope of these claims, nor have these amendments been made to define over the prior art. Rather, the amendments to the claims have been made to improve the form thereof. In light of the amendments and remarks set forth below, Applicants respectfully submit that each of the pending claims is in immediate condition for allowance.

The amendments have been made to clarify calculating a signal supplied to the alignment detector based at least on formulas (4)-(7) set forth in the present specification. Parameter/condition defined in claims corresponds at least to coefficients K, A and B etc., which are described in the specification.

The Office Action rejects claims 24-26, 28, 33 and 34 under 35 U.S.C. § 102 (b) as being anticipated by U.S. Patent No. 5,627,373 ("Keese"). Applicants respectfully traverse this rejection.

Claim 24 is directed to a charged particle beam apparatus including a charged particle source, an optical element, an alignment deflector and a control device. In particular, the control device calculates a condition of the alignment deflector based on different two dimensional deviations obtained by supplying the alignment deflector with different signals. Further, the control device calculates a signal supplied to the alignment deflector with the calculated condition so that a two dimensional deviation becomes zero or nearly zero regardless of variation of an operation condition of the optical element.

With the claimed apparatus, it is possible to enhance throughput because an operational condition of the alignment deflector can be calculated if image deviations are obtained in terms of at least two alignment conditions.

According to the present invention, different alignment conditions are obtained with respect to an image deviation to a variation of an optical element such as an objective lens. A condition of an alignment deflector is calculated based on image deviations obtained regarding the respective different alignment conditions (for example two conditions). An optimal signal input to the alignment deflector is generated in response to the calculated condition of the alignment deflector. "Optimal" means that the image deviation becomes zero or nearly zero if the condition of the optical element is varied. Thus, unlike Keese, according to the present invention, it is not required that the alignment operation is carried out in an iterative manner until the amount of the image deviation becomes a value less than a predetermined threshold. This technical effect leads to the enhancement of the throughput of the apparatus.

Keese, however, neither teaches nor suggests the above features of claim 24. In particular, Keese describes varying a focus of an object lens between extremes of a focal range to detect an image deviation and calculating an amount of alignment correction based on the image deviation to adjust an alignment of a deflector (alignment coil). In addition, Keese teaches carrying out the alignment operation in an iterative manner until the amount of the image deviation becomes a value less than a predetermined threshold.

In Keese, a deviation value between images is calculated when the focus of the objective lens is varied at both ends of the focal range. After the image deviation is detected, trial and error alignment operation is repeatedly performed until the deviation value is below the threshold. It may require many iterations to optimally adjust the alignment of the deflector so the throughput of the apparatus is degraded.

Therefore, the present invention as in amended claim 24 is not anticipated by Keese and distinguishable over the cited art.

Claim 34 has the same limitations as claim 24. Therefore, claim 34 is not anticipated by Keese either and is also distinguishable over the cited art.

Claims 25-33 depend from claim 24 either directly or indirectly which is patentable, thus, they too are patentable.

New claim 35 defines the alignment operation more specifically than claim 24. Thus, claim 35 is also patentable over the cited references.

Applicants have responded to all of the rejections and objections recited in the Office Action. Reconsideration and a Notice of Allowance for all of the pending claims are therefore respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

If the Examiner believes an interview would be of assistance, the Examiner is welcome to contact the undersigned at the number listed below.

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Respectfully submitted,

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